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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/533,517	03/23/2000	Zhanhe Shi	CISCO-1254	3821

7590 05/22/2003

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EXAMINER	
RYMAN, DANIEL J	
ART UNIT	PAPER NUMBER
2665	6

DATE MAILED: 05/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/533,517	Applicant(s) SHI ET AL.	
	Examiner Daniel J. Ryman	Art Unit 2665	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 March 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *3/23/2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4,5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 6/14/2000 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. There is no copy of McKeown, et al., "The Bay Bridge: A High Speed Bridge/Router."

Drawings

2. Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

4. The abstract of the disclosure is objected to because it exceeds 150 words in length. Correction is required. See MPEP § 608.01(b).

5. The disclosure is objected to because of the following informalities: on page 7, lines 18-20, the phrase "There may be multiple output interfaces 370a-370q with corresponding output queues 360a-360q, although these are not shown..." would be better understood as "There may be multiple output interfaces with corresponding output queues, although these are not shown..." since the reference numbers are not needed considering the parts are not shown.

Appropriate correction is required.

6. The disclosure is objected to because of the following informalities: on page 16, lines 2-3 "for each of the K input interface queues" would be better understood as "for each of the n input interface queues" to match Fig. 4 (320-n).

Appropriate correction is required.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duffield et al (USPN 6,452,933) in view of Ruszczyk et al (USPN 5,615,212) in further view of Beshai (USPN 6,118,792).

9. Regarding claims 1, 11, 21, and 31, Duffield discloses a method, apparatus, and program for controlling congestion in a networking device having a plurality of input interface queues (ref. 20), where programs are well known in the art as a more flexible way to implement a method compared to hardware, comprising the steps of and means for: determining the load of

each said input interface queue (col. 3, lines 13-54); and using the load of each said input interface queue to determine the sequence in which said input interface queues should be polled (col. 4, line 63-col. 5, line 34) where it is obvious that the "longest delay first scheduler" and the "least time to overflow mechanism" determines which queues to service depending on the load of each queue. Duffield possibly does not expressly disclose that estimation of the arrival rate for each queue is used to determine the quantity of data to be processed from each said input interface queue each time each said input interface queue is polled. Ruszczyk discloses, in a polling system, in order to allow for better channel usage, that it is well known to use "pipeline polling" in which a central controller uses information about the queue in order to determine how long each queue will have access to the channel (col. 1, lines 44-57) where the length of time a queue accesses a channel is equivalent to the quantity of data to be processed. Beshai discloses, in a switch, using an estimated data arrival rate to determine the length of an access time (length or time a queue accesses a channel) for each queue (col. 2, line 64-col. 3, line 24) where the length of time a queue is accessed is equivalent to the quantity of data to be processed. It would have been obvious to one of ordinary skill in the art at the time of the invention to use an estimated data arrival rate for each queue to determine the quantity of data to be processed from each said input interface queue each time each said input interface queue is polled in order to improve channel usage. In addition, Duffield in view of Ruszczyk in further view of Beshai suggests using an estimation of the data arrival rate to determine which the polling sequence of queues rather than solely the load of the queue since it is well known that the load of the queue is directly linked to the arrival rate of the data and since it is well known that traffic patterns are known to be unstable. It would have been obvious to one of ordinary skill in the art at the time of

the invention to use an estimation of the data arrival rate on each queue in order to predict the queues that are in need of servicing since traffic patterns are well known to be very unstable.

10. Regarding claims 2, 12, and 22, referring to claims 1, 11, and 21, Duffield in view of Ruszczyk in further view of Beshai discloses that said data arrival rate on each said input interface queue is estimated based on the static link capacity of each said input interface queue (Duffield: col. 5, lines 21-24) where Duffield's "associated rate" is taken to be the static link capacity.

11. Regarding claims 3, 13, and 23, referring to claims 1, 11, and 21, Duffield in view of Ruszczyk in further view of Beshai discloses that said data arrival rate on each said input interface queue is estimated based on a dynamically updated measurement (Beshai: col. 2, line 64-col. 3, line 24).

12. Regarding claims 4, 14, and 24, referring to claims 1, 11, and 21, Duffield in view of Ruszczyk in further view of Beshai possibly does not expressly disclose that said data arrival rate on each said input interface queue is estimated using an exponential averaging function based on a constant factor and on the difference in arrival times between a current data packet and a previous data packet into said input interface queue; however, exponential averaging is well known in the art because it gives a better prediction than normal averaging by giving less weight to more historic data since more historic data is less predictive of future trends than more recent data. It would have been obvious to one of ordinary skill in the art to use exponential averaging based on a constant factor and on the difference in arrival times between a current data packet and a previous data packet in order to predict future arrival times while having the constant factor smooth the trends.

13. Regarding claims 5, 15, and 25, referring to claims 1, 11, and 21, Duffield in view of Ruszczyk in further view of Beshai possibly does not expressly disclose that said data arrival rate on each said input interface queue is estimated using an exponential averaging function based on the difference in arrival times between a current data packet and a previous data packet into said input interface queue; however, exponential averaging is well known in the art because it gives a better prediction than normal averaging by giving less weight to more historic data since more historic data is less predictive of future trends than more recent data. It would have been obvious to one of ordinary skill in the art to use exponential averaging based on difference in arrival times between a current data packet and a previous data packet in order to predict future arrival times.

14. Regarding claims 6, 16, and 26, referring to claims 1, 11, and 21, Duffield in view of Ruszczyk in further view of Beshai discloses that said networking device is a router (Duffield: abstract and col. 4, lines 6-27) where an "apparatus for routing packets" is taken to be a router.

15. Regarding claims 7, 17, and 27, referring to claims 2, 12, and 22, Duffield in view of Ruszczyk in further view of Beshai discloses that said networking device is a router (Duffield: abstract and col. 4, lines 6-27) where an "apparatus for routing packets" is taken to be a router.

16. Regarding claims 8, 18, and 28, referring to claims 3, 13, and 23, Duffield in view of Ruszczyk in further view of Beshai discloses that said networking device is a router (Duffield: abstract and col. 4, lines 6-27) where an "apparatus for routing packets" is taken to be a router.

17. Regarding claims 9, 19, and 29, referring to claims 4, 14, and 24, Duffield in view of Ruszczyk in further view of Beshai disclose that said networking device is a router (Duffield: abstract and col. 4, lines 6-27) where an "apparatus for routing packets" is taken to be a router.

18. Regarding claims 10, 20, and 30, referring to claims 5, 15, and 25, Duffield in view of Ruszczyk in further view of Beshai discloses that said networking device is a router (Duffield: abstract and col. 4, lines 6-27) where an "apparatus for routing packets" is taken to be a router.

19. Regarding claims 32, 34, and 36, referring to claims 1, 11, and 21, Duffield in view of Ruszczyk in further view of Beshai discloses that said step of and means for estimating the data arrival rate on each said input interface queue is performed sequentially with respect to said step of and means for using the estimated data arrival rate on each said input interface queue to determine the sequence in which said input interface queues should be polled and the quantity of data to be processed from each said input interface queue each time each said input interface queue is polled (Beshai: col. 3, lines 11-15). Beshai discloses that the predictive algorithm monitors predictive load and periodically updates the access time based on the predictive load. Since the predicted load is determined before the access time is updated, it is obvious that the estimation of the data arrival rate is performed sequentially with respect to the step of using the estimated arrival rate.

20. Regarding claims 33, 35, and 37, referring to claims 1, 11, and 21, Duffield in view of Ruszczyk in further view of Beshai discloses that said step of estimating the data arrival rate on each said input interface queue is performed independently with respect to said step of using the estimated data arrival rate on each said input interface queue to determine the sequence in which said input interface queues should be polled and the quantity of data to be processed from each said input interface queue each time each said input interface queue is polled (Beshai: col. 3, lines 11-15). Beshai discloses that the predictive algorithm monitors predictive load and periodically updates the access time. Because the monitoring occurs continuously, while the

update to the access time occurs only periodically, it is obvious that the estimating of the data arrival rate occurs independently of the step of using the estimated arrival rate.

21. Regarding claims 38, 41, and 44, referring to claims 1, 11, and 21, Duffield in view of Ruszczyk in further view of Beshai discloses that the rate at which data are processed from each said input interface queue is proportional to the data arrival rate on each said input interface queue (Duffield: col. 4, line 63-col. 5, line 34 and Beshai: col. 2, line 64-col. 3, line 24), where the ratio of the data arrival rate to the processing rate, even if not constant, will give the proportional relationship between these two values.

22. Regarding claims 39, 42, and 45, referring to claims 32, 34, and 36, Duffield in view of Ruszczyk in further view of Beshai discloses that the rate at which data are processed from each said input interface queue is proportional to the data arrival rate on each said input interface queue (Duffield: col. 4, line 63-col. 5, line 34 and Beshai: col. 2, line 64-col. 3, line 24), where the ratio of the data arrival rate to the processing rate, even if not constant, will give the proportional relationship between these two values.

23. Regarding claims 40, 43, and 46, referring to claims 33, 35, and 37, Duffield in view of Ruszczyk in further view of Beshai discloses that the rate at which data are processed from each said input interface queue is proportional to the data arrival rate on each said input interface queue (Duffield: col. 4, line 63-col. 5, line 34 and Beshai: col. 2, line 64-col. 3, line 24), where the ratio of the data arrival rate to the processing rate, even if not constant, will give the proportional relationship between these two values.

Conclusion

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Shimojo (USPN 6,490,248) see entire document. Koo (PGP 2002/0039369) see entire document.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Ryman whose telephone number is (703)305-6970. The examiner can normally be reached on Mon.-Fri. 7:00-5:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (703)308-6602. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-6743 for regular communications and (703)308-9051 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

Daniel J. Ryman
Examiner
Art Unit 2665

DJR

Daniel J. Ryman
May 14, 2003

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SUPERVISORY PATENT EXAMINER
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